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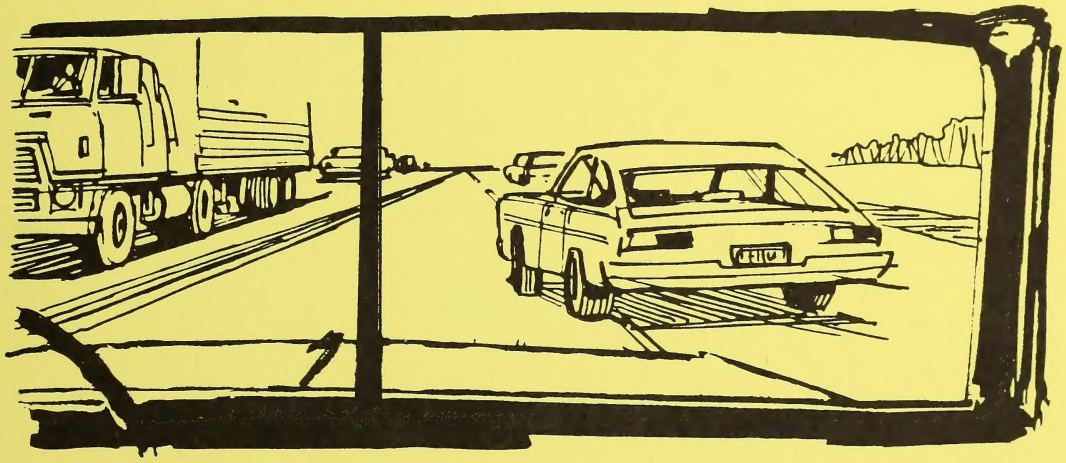
SCHOOL BUS DRIVER IMPROVEMENT PROGRAM



SERIES 4

PROFESSIONAL DRIVING SKILLS

Alberta
TRANSPORTATION

SERIES 4

PROFESSIONAL DRIVING SKILLS

PROFESSIONAL DRIVING SKILLS

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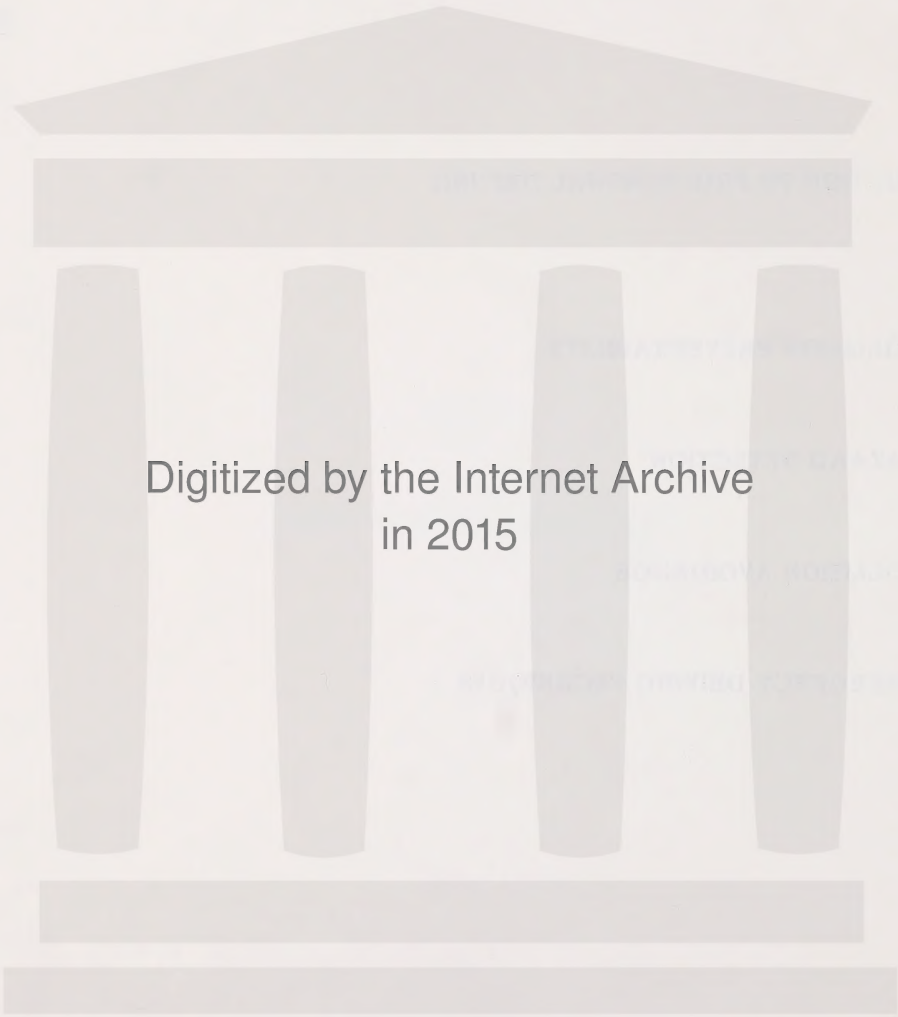
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INTRODUCTION

TO

PROFESSIONAL DRIVING

PROFESSIONAL DRIVING SKILLS: AN OBJECTIVE

The entire School Bus Driver Improvement Program has been designed to help you become a better and safer school bus driver. Some of the series focus on basic driving skills, while others, such as this one, deal with some of the more "advanced" aspects of the driver's job. In Professional Driving Skills, we introduce the concepts of defensive driving for the professional, recognizing that your job is indeed that of a professional. The lives of young people are put on the line every time you get behind the wheel of the bus. Unlike the commercial airline pilot who receives the assistance of air traffic controllers, you must do it all on your own. Consequently, it is absolutely essential that your driving skills be professional. The prime objective of this series is to provide the resource material and practice to allow you to sharpen and tone your skills to the professional level.

WHO SHOULD TAKE "PROFESSIONAL DRIVING SKILLS"?

It is strongly recommended that all school bus drivers take this series of the program. If you are a new school bus driver, you should take this series only after completing Series #1 - Bus Operation Manoeuvres. If you are an experienced driver - and your Course Manager approves - you may proceed directly with this series without completing Series #1. We would, however, advise you to at least read through the modules of Series #1 quickly, as a refresher. In working through the modules of Series #1 and Series #4, it is very likely that the experienced driver will find there is much that he has either forgotten or didn't really know in the first place. The professional driver realizes that he will never stop learning, and that it is useful to refresh and up-grade his skills at regular intervals.

The professional driver typically has a very specific attitude toward safety and the operation of a motor vehicle. When he is behind the wheel of his vehicle, he is fully conscious of his responsibility to himself and others, and takes every reasonable precaution to avoid a mishap while driving. Many people refer to this as "defensive driving."

In this series, you will learn about traffic collisions, what causes them and what you can do to prevent them from happening. The series is divided into 4 modules, as follows:

4.1 Collision Preventability

- provides a detailed overview of collisions, conditions causing and affecting them, and sets the stage for improving your school bus driving skills.

4.2 Hazard Detection

- techniques and strategies you can employ to detect potential and actual driving hazards.

4.3 Collision Avoidance

- deals with the 6 types of two-vehicle collisions and the defenses you can use to avoid them. Also considers collisions between buses and other roadway users and objects.

4.4 Emergency Driving Techniques

- while your objective is to avoid emergencies, you must be prepared to deal with them when they arise. Deals with driving your bus in a skid, with a tire blow-out, brake failure, etc.

This series also includes:

Appendix A - Railway Crossing Safety

Appendix B - Drive Safe, Smooth and Save

Driving defensively involves understanding key concepts about driving and applying them to the way you drive. This series is intended to make you aware of these concepts and, where practical, to allow you to practise them while you are actually driving a bus. So, with that brief introduction, go to it and good luck!

4.1

COLLISION PREVENTABILITY

4.1 COLLISION PREVENTABILITY

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OBJECTIVE

Be able to correctly answer a series of questions which will demonstrate your understanding of the nature of traffic collisions and the factors affecting them.

Sample Skill Check: Before going on with the module, review Sample Skill Check on p. I of yellow segment of the Student Question and Answer Section.

THE COLLISION PROBLEM

Traffic collisions in Canada are a serious problem. And, whether or not you've ever been involved in collision, it is very much your problem. The facts are staggering. Consider that:

- approximately every 2 hours somebody dies in a traffic collision. That's almost 12 people killed every day!

- in 1 year, approximately 4,000 people are killed in traffic collisions;

- one out of every 3 people living today will be involved in a crippling or fatal traffic crash during their lifetime.

It doesn't sound very good, does it? But, don't throw up your arms in despair. There are many organizations and individuals attacking the problem in a variety of ways. By improving your driving skills, you can be part of the solution as well.

Over the past few years, pupil transportation in Alberta has had a very commendable record with respect to traffic safety and avoidance of collisions. There have been crashes, however, and a serious problem still exists. And when a crash involves a school bus, the potential for disaster is extremely high!

The modules in this series have been developed to help you improve your driving skills to avoid traffic collisions of all types. Studies have shown that the average driver is capable of driving at least twice as safely as he does currently. With young passengers on your bus depending on you, you can't afford to be driving at one-half your potential.

THE PERFECT TRIP

While the focus of this program is driver improvement, it could be said that we are striving to have our school bus drivers become "perfect drivers." You may be safe in thinking that perfect driving is not possible, but let's stop to consider what we mean by perfect driving. To do this, we'll take a leaf from the book of professional truck drivers, which is equally applicable to you as a bus driver.

The good driver knows that perfect driving is achieved by having one perfect trip at a time. And a perfect trip is any trip characterized by the lack of one major trait: ERRORS. Error avoidance is the key to so-called perfect driving. Throughout the rest of this series, we will be concentrating on error avoidance, but first consider the types of errors that can occur while driving a school bus to spoil that perfect trip. They include:

1. Collisions

   - This can be the most serious and costly error a driver can make, in both human and dollar terms.

2. Traffic Violations

- In addition to the laws of the road which apply to the ordinary motorist, the school bus driver must obey a number of additional laws governing the operation of his bus. These include such things as the requirement to stop at railroad crossings, the proper use of alternately flashing lights, etc. All of these laws have been developed over time, based on past experience, and have one common goal: avoidance of collisions and the promotion of safety.

3. Vehicle Abuse

- The provision of a new school bus costs a school jurisdiction up to $35,000 (out of the taxpayers' pockets). Consequently, jurisdictions attempt to maximize vehicle life through a controlled maintenance program. But an inexperienced or untrained driver can shorten the life of a vehicle drastically, despite the mechanic's efforts, by not performing inspections, riding the clutch, braking excessively, driving in the wrong gear, etc. Avoiding these errors is the topic of Series #1 and #2.

4. Schedule Delays

- While this may not appear to be of equal seriousness, failure to adhere to bus schedules can cause a variety of inconveniences and problems for a great many individuals. During the winter, these are compounded by the threat to physical safety caused by extreme cold. Pupil transportation depends on punctuality.

5. Discourtesy

- When a school bus driver is behind the wheel of his bus, to many people he is the educational system. If he exceeds the speed limit, makes reckless passes, straddles lanes or blocks traffic needlessly while loading or unloading, he is damaging the image of the entire school system, not just himself. And if his discourtesy leads to other motorists becoming hot-headed, a hazard has been created.

The successful avoidance of all of these errors during your daily run means you have made a perfect trip. It's not such a difficult thing to do because all of these errors are interrelated. By carefully and consciously driving to avoid collisions, you almost automatically avoid making the other types of driving errors.

Before reading on, compare your own driving skills with those of an "average driver" with respect to error avoidance. Use a scale of 1 to 10 to rate yourself and the average driver on each of the following categories. This is strictly for fun, but be honest with yourself. (Answer on a separate sheet)

ABILITY TO:	YOUR DRIVING	"AVERAGE DRIVER"
1. Avoid collisions	____	____
2. Avoid Traffic Violations	____	____
3. Avoid Vehicle Abuse	____	____
4. Avoid Schedule Delays	____	____
5. Avoid Discourtesy to Others	____	____
TOTAL SCORE	____	____

How did you do? Do you see room for improvement?

In the rest of this module and this series, we are going to concentrate on avoiding collisions. In doing so, the other errors will take care of themselves.

Ninety-eight percent of the time driving is a relatively routine matter, but avoiding collisions during that other 2% can be extremely difficult. As a professional school bus driver, 100% avoidance of collisions should be your conscious objective.

COLLISION PREVENTABILITY

As you may have already guessed, the key to collision prevention is you. Throughout this series, we are going to be discussing what you can do to prevent collisions.

To begin, the Canada Safety Council has developed a definition of what exactly a "preventable collision" is. The Council says that:

> "a preventable collision is one in which you fail to do everything you reasonably could have done to prevent it."

Let's look at this definition a little more closely. What should be emphasized is that you must do everything reasonable to prevent a collision. If, having done so, the crash still happens, the collision was non-preventable by you (and was probably preventable by someone else). Note the use of the word "reasonably." The idea that most collisions are preventable makes it important to differentiate between "reasonable" and "possible" precautions you can take to avoid being involved in a traffic collision. The most obvious "possible" precaution would be not to drive, but that is hardly "reasonable".

This brings us to a second Canada Safety Council definition:

"Defensive driving is driving to prevent collisions in spite of the incorrect actions of others and adverse conditions."

The incorrect actions of others can include a whole host of things and, over these things, you have no control. However, there are six conditions surrounding every crash which you can and must adjust to in order to prevent it from occurring.

Six Conditions Affecting Collisions

The six variables in any driving situation are:

- light conditions;
- weather conditions;
- road conditions;
- traffic conditions;
- condition of your vehicle;
- condition of you, the driver.

Let's briefly consider each individually:

1. Light - Both too little and too much light can create hazards. The sun can create a tremendous glare on your windshield, particularly if it is dusty. Conversely, at dusk, the light in the atmosphere can make it very difficult to see other vehicles or to be seen by others.

2. Weather - As you are aware, weather also affects your ability to see and be seen. It can make roads (particularly grid roads) extremely slippery and cause you to lose control.

3. Road - Roads can present many hazards to the driver, particularly if they are foreign to him. Both geography and road construction can interact to make driving treacherous. Some hazardous conditions associated with roads include:

   - curves;
   - soft shoulders/drop offs;
   - potholes;
   - poor highway markings;
   - slippery surfaces.

4. Traffic - Traffic can be heavy or light, fast or slow. Traffic conditions will vary according to the time of day, day of the week, season, etc. You must learn to adjust your pace to the flow of the traffic.

5. Vehicle - Does your bus respond instantly and effectively to your controlling efforts? If you are routinely performing your daily inspections, do not allow any perceived mechanical problem to fester, no matter how insignificant it seems at the time. The stakes are too high.

6. Driver - Last, but hardly least! As a professional school bus driver, you have a grave responsibility to ensure that you are fully capable of performing your duties. There are many adverse driver conditions which could interfere with this:

- fatigue;
- emotions (anger, fear, worry, etc.);
- alcohol or drug impairment;
- physical impairments (defective hearing or eyesights, etc.).

Each of these conditions is critical on its own. The problem arises because you seldom encounter a situation with one of these conditions on its own. They tend to be grouped together and their effects on your driving can be compounded. The important point is that you learn to recognize when any or all of these conditions is adversely affecting your driving and adjust your driving behaviour accordingly.

What can you do to make sure that these conditions don't gang up on you? At a very minimum, you should attempt to anticipate the conditions you are likely to encounter during your daily trip. Try using the PRE-TRIP MENTAL INVENTORY, which works like this: Before you start your daily run, get behind the steering wheel and sit there for a minute or two. While you think about the driving conditions you are likely to encounter, ask yourself:

"Are there any unusual conditions of light, weather, road or traffic that I can expect? Am I fit to drive? Am I rested or tired; calm or emotionally disturbed? If I'm taking medications, how will they affect my driving?"

After you've answered these questions, fasten your safety belt, turn on the ignition, and go. You've mentally prepared yourself for the driving conditions you could meet on the trip ahead.

To be fully prepared, however, requires a more thorough "examination" of you, your vehicle, and the driving environment. The inspection of your bus as a daily routine is covered in detail in Series #2. By way of summary, the following checklist itemizes the points you should consider in going through a detailed mental inventory:

SCHOOL BUS DRIVERS'

MENTAL INVENTORY CHECKLIST

1. Driver Condition

- Physical
  - am I fully rested?
  - free from alcohol or drug impairment?
  - not suffering from effects of medication?

- Mental
  - am I relaxed and free from tension?
  - able to concentrate fully on driving?
  - do I have a courteous, careful and considerate attitude?

2. Vehicle Condition

- Under the Hood
  - fluids/lubricants at proper level?
  - connections sound?
  - battery terminals/general appearance?

- Exterior
  - lights and signals all working?
  - exhaust system?
  - tires and wheels?
  - emergency door working?
  - windshield and wipers?
  - general appearance/lettering visible?

- Interior
  - signals/indicators/gauges all working?
  - mirrors properly adjusted?
  - heater and defroster working?
  - horn?
  - emergency equipment?
  - emergency door/seats?

3. Condition of the Environment

- Light
- Weather
- Road
- Traffic

What adjustments, if any, are required to compensate for these conditions?

The topics covered in this module are closely tied into the material dealt with in the balance of this series, as you will soon see. To complete this module, try to answer the questions in the review exercise on p. V in the Yellow Segment of the Student Question and Answer section and, when ready, do the overall skill check on p. XII.

4.2

HAZARD DETECTION

4.2 HAZARD DETECTION

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OBJECTIVES

A. Given a series of descriptions of hazardous situations and the clues that indicate the hazard, be able to describe, in a few words, how serious the hazard is and the action you would take to avoid or minimize the hazard.

B. Accompanied by the Course Manager on a school bus, be able to demonstrate the "commentary driving" technique while driving the bus over a designated route. Your commentary should include all relevant events that are developing around the bus as you drive.

Sample Skill Check: Before going on, look at Sample Skill Check, p. XIX in yellow segment of the Student Question and Answer Section.

INTRODUCTION

In Module 4.1, the definition of "defensive driving" was introduced. We will be looking much more closely at this concept in this and the remaining modules of this series. Because of its importance, the definition bears repeating at this point: defensive driving is driving to prevent collisions in spite of the incorrect actions of others and adverse conditions:

In actuality, there is nothing really new about the concept of defensive driving. It is merely the putting into practice of the standard collision prevention formula, which says:

1. RECOGNIZE THE HAZARD
2. UNDERSTAND THE DEFENSE
3. ACT IN TIME

If you stop to think about it, this formula has general applicability to any human activity which involves risk, not just driving a motor vehicle.

With the recent emphasis on defensive driving, more and more drivers are becoming aware that just about every driving situation has potential hazards. It's not enough just to know what you're doing. You have to know what everyone else is doing, too. If you have been driving a school bus for any length of time, you are aware of some of the hazards involved in your daily run. Some hazards are obvious; some aren't. Some are always there, like the sharp curve. And, some appear out of nowhere, depending on the changing traffic situation. Do you consciously search for hazards as you drive?

In this module, you'll learn a systematic technique for detecting hazards. You'll use most of your senses to pick up clues that indicate potential and actual dangers. And, you'll make decisions about how you should adjust your driving to minimize or avoid hazards. You should get into the habit of being an "automatic hazard detector." Expert school bus drivers drive well because they find the hazards before the hazards find them.

You should develop a "mental image" of the clues associated with each hazard. The habit of detecting clues must be strong enough that you can:

1. distinguish clues within a complex, changing traffic situation;

2. identify them within the short period of time your eyes are focused upon the situation in normal scanning;

3. detect them even when you are not consciously looking for them.

Failure to recognize hazards in time is a major cause of traffic collisions.

THE ELEMENTS OF DEFENSIVE DRIVING

Before getting into the specifics of hazard detection, let's briefly consider the elements of defensive driving. An understanding of these elements provides a more solid base upon which to develop the skills of hazard detection in practice.

In order to successfully avoid collisions, the defensive driver requires a high degree of knowledge, alertness, and foresight in recognizing collision producing situations when they occur, and he must exercise judgement and skill in executing his "defense." Individually, these are:

1. Knowledge - This comes from many sources, including your Alberta "Operators' Manual" and "School Bus Drivers' Manual". It must also include recognition of driving hazards and the proper methods to protect yourself against them. A good deal of knowledge about driving can be acquired through experience, but experience, contrary to reputation, is a spotty and hazardous teacher when it comes to driving. Traffic safety experts are convinced that knowledge of driving should be acquired through a planned program, such as the one you are taking now.

2. Alertness - Alertness in driving is the habit of keeping one's attention focused on the driving job and free of distractions. It involves an attitude of watchfulness for collision-causing factors and the ability to recognize them instantly. The alert driver sees everything that goes on in front of his vehicle and, by checking his mirrors frequently, a great deal that goes on at the sides and

rear. But, he only acts on those things that will affect the safety of his vehicle. The habit of alertness can be developed consciously and is improved with practice.

3. Foresight - This is the ability to anticipate and prepare for most eventualities. It consists of being able to size up traffic situations as far ahead as possible, to anticipate how they are likely to develop, and to decide whether these developments will endanger one's vehicle.

4. Judgement - Good judgement implies a recognition of the alternatives present in any traffic situation and the ability to arrive at a wise choice in time to avoid a collision. It depends upon knowledge and experience and, also, upon such intangibles as intuition and common sense.

5. Skill - Skill is the ability to manipulate the controls of your bus to successfully perform basic traffic manoeuvres such as making turns, passing, reversing and parking. There is a right way to do each of these. Skill is developed through learning how to do them the right way, and then DOING THEM THE RIGHT WAY EVERY TIME.

When you put these 5 elements together behind the wheel of your school bus, you are driving defensively. Conscious effort and practise will ensure that you put them together at all times while driving.

There is a useful acronym which can help you put the elements of defensive driving together and be a defensive driver. The acronym is SIPDE and the individual letters have special significance for helping you put the collision prevention formula into action. Here's what SIPDE stands for:

S**e**arch - your driving environment constantly for hazardous clues.

I**n**vestigate - clues which could become hazards.

P**r**edict - what you expect to develop based on your instantaneous investigation of the hazard clues.

D**e**cide - on a course of action to minimize or eliminate the hazard.

E**x**ecute - your action plan.

Most people go through the mental process of searching, investigating, predicting, deciding and executing unconsciously while they're driving anyway, without knowing about SIPDE. The problem arises, however, because there is a tendency for our minds to wander and the process stop. But, by knowing the acronym, it helps focus your mind, and if you flash it through your mind relatively frequently, you will have developed an important trick for maintaining mental alertness.

Now, let's spend some time on the substance of hazard detection - searching for clues.

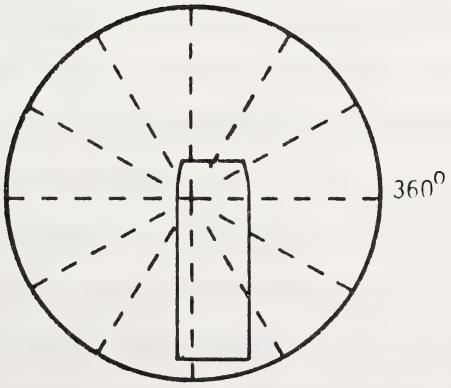
SEARCHING FOR CLUES

There are several important points you should know about searching for clues to hazards.

1. Continuously scan surroundings on and off the roadway, shifting your gaze frequently. Look well ahead in the lane to focus distance relative to the bus' speed and the roadway location. Specifically,
   - focus at farther distances as your speed increases;
   - view the road ahead one full block in a city;
   - focus at farther distances down the road in rural areas than you would in urban areas.

   Avoid fixing your eyes on the road surface immediately in front of the bus.

   Develop the surveillance habit of scanning 360 degrees around the bus.



2. Maintain an unobstructed view

- In a moderate number of cases, collisions occur at intersections where vision is obstructed or limited by buildings, vegetation or parked cars.

- Roadside features that obscure your vision at intersections should be treated as if they were traffic lights and signs requiring you to stop. By stopping, you have an opportunity to study the traffic situation more carefully before proceeding, rather than haphazardly continuing.

3. Observe and note the actions of other drivers

- Collisions related to overtaking vehicles have been caused frequently by the driver's failure to note the actions of vehicles ahead. For example, many crashes are caused by a driver's failure to note traffic stopped ahead for a left turn.

- Another cited cause is failure to check traffic in the adjacent lane.

4. Know the demands imposed on you when driving in urban or congested areas

- Visual demands on the driver appear to be about three times as great in the city as at higher speeds on a modern divided highway. The mere presence of pedestrians and children increases your surveillance requirements.

- The greater need for surveillance in the city is partially due to the greater concentration of other vehicles. Traffic controls and pedestrian traffic also contributes to making city driving a difficult task.

- Driving alongside parked vehicles is potentially hazardous because your view is limited. Hazards can appear when there is little time or space for evasive action.

- Three key sources of hazards are:

  - the spaces between parked vehicles through which pedestrians and animals may dart into the street;
  - the parked vehicle that may suddenly move into the bus' path;
  - occupants of parked vehicles who may open the vehicle doors to get out without first checking the traffic situation. Positioning your bus at least 1 1/2 metres (4 ft) out from the parked vehicles will place it beyond the arc of a door being opened.

Usually, there are clues from parked vehicles of impending entry into a driving lane. Among the clues you will find useful are:

- Exhaust fumes. These indicate the engine is running.

- Back-up lights. For these lights to be activated, the ignition must be on and the gearshift lever in reverse. The appearance of back-up lights is often followed by a shift to a forward gear.

- Brake lights. Most drivers depress the brake pedal, thus activating the brake lights, just prior to shifting to a forward gear.

- Front wheels. The direction toward which the front wheels are pointed may indicate whether the vehicle is ready to leave the space or still manoeuvring into a good position for leaving.

- Steering wheel. The steering wheel of vehicles parked to the right of the bus can be seen from some distances. If a steering wheel is not visible, it may mean the driver is behind the wheel.

You must know how to gather these and other critical clues. The bus driver who keeps abreast of the driving situation by continuous surveillance of traffic, traffic controls and the surrounding environment will be more likely to recognize hazards while there is time to avoid them. Be aware that you receive the vast majority of the clues you use through your eyes. The more intently you fix your central vision on a particular object, the less aware you will be of clues from your larger field of indirect vision.

Now that you have completed the first part of Module 4.2, try the Review Exercise, P.XXI in the yellow segment of the Student Question and Answer Section.

DETECTING ROADWAY HAZARD CLUES

In this section, some of the common roadway hazard clues of which you should be aware out outlined. Roadway hazards are those which pertain to the condition of the road itself and, basically, fall into four categories;

- sight distance limitations
- manoeuvring limitations
- traction limitations
- traffic conflict points

Sight Distance Limitations

Usually, your vision will be restricted on a roadway due to the existence of curves, hills or dips. You should take the following precautions when confronted with these limitations:

- Watch the road ahead for indications of a curve.

- When approaching a curve, estimate a safe speed (if not posted) from the degree of curvature and banking.

- Watch the road and roadside conditions (e.g., trees and poles) for signs of hills.

- In approaching a downgrade, identify a grade which is steep enough to require downshifting.

- identify the presence of dips which may obscure another vehicle.

Manoeuvring Limitations

Driving a school bus in certain situations can be more hazardous than for an ordinary automobile because of the bus' manoeuvring requirements. Compensate for these requirements whenever you detect:

- narrow or narrowing lanes;
- roadway construction that is difficult to perceive clearly;
- gravel or dirt road surfaces which have been rutted by the travel of other vehicles.

Traction Limitations

The defensive school bus driver learns through experience to "feel the road" with his bus. Be on the lookout for rough surface roads which have:

- surface irregularities on asphalt and concrete, such as potholes, frost heaves, cracked pavement, etc.;
- wooden surfaces (such as small bridges) containing cracks, holes, and protruding nails;
- washboard conditions (i.e., continuous ruts).

Many municipal district roads are also notorious for their extreme slipperiness after even the smallest amount of rain. The clay base of these roads renders them like a bar of soap to drive on when wet. Exercise extreme caution and be constantly aware of when your wheels are skidding. Other traction limitations resulting in reduced friction include:

- oil or grease spills;
- snow or ice, particularly in shaded areas such as underpasses;
- "black ice" caused by freezing temperatures following a rainstorm.

Traffic Conflict Points

Traffic conflict points are those points on a roadway which require vehicles to merge, intersect, cross paths, etc. The conflict arises because two or more vehicles approaching from different directions are "competing" for the same space on the roadway. Examples of such conflict points include intersections, acceleration and deceleration ramps on freeways, parking lots, and merging lanes at bridges and hilltops.

Some of the special hazards connected with freeway driving are worth noting:

- If driving on an entrance ramp, be alert for vehicles which are stopped or slowing down on the on-ramp.

- If driving on a long entrance ramp with an acceleration lane that continues on as an off-ramp or deceleration lane, be aware that vehicles may leave the main roadway and cross over to merge onto the acceleration lane. Out-of-province drivers may be unfamiliar with exits and merge at the last moment.

- When approaching and entering an off-ramp:
  - be alert for vehicles entering the deceleration lane: if that lane is also part of the acceleration lane for vehicles entering the roadway;
  - when nearing the end of the off-ramp, look for other vehicles which may be stopped or waiting in line at the end of the off-ramp.

- When approaching and passing interchanges on the freeway, note vehicles in the deceleration lane swinging back into the lane at the last moment.

Most school bus drivers in Alberta do not regularly have to drive on freeways. It is important, however, that you understand the hazards, even if only for special field trips.

DETECTING OTHER DRIVING HAZARDS

In addition to the "roadway hazards" cited earlier, there are also single vehicle hazards, multiple vehicle hazards and a variety of other road user hazards. These will be dealt with briefly, as it is important for you to understand the background to these hazards. As noted in a previous section, it is KNOWLEDGE applied systematically which helps develop ALERTNESS and FORESIGHT and allows you to exercise good JUDGEMENT in potentially hazardous driving situations.

Single Vehicle Hazards

As the name implies, these hazards have been classified as single vehicle because they involve the motion of an individual vehicle. There are many reasons why another driver may present a hazard to you, such as his inattentiveness to his driving, loss of control, or his failure to communicate his intentions to you. The following clues from the other driver demand that you give him an extra wide berth when you detect them:

- frequent lane changes, suggesting inattentiveness, indecisiveness, or alcohol impairment;

- frequent speed changes when conditions do not require it;

- failure to signal driving intention;

- quick, jerky stops as opposed to a gradual deceleration in non-emergency situations;

- out-of-province license plates, which suggests that the driver may be unfamiliar with road conditions and directions;

- failure to adjust to dangerous driving conditions, such as heavy rainfall or icy roads;

- failure to respond appropriately to your signals of intention (e.g., overtaking your bus too quickly when you decelerate for a stop);

- false signals (e.g., a driver who has been displaying a turn signal over a long period of time);

- special vehicles (e.g., slow-moving farm tractors, emergency vehicles, vehicles required to stop frequently).

It's not important that you know this list of hazards - indeed there are others that you can probably think of which have not been mentioned. What is important is that you learn to spot a potential hazard and estimate its seriousness, giving yourself a good basis for taking appropriate action.

Multiple Vehicle Hazards

As well as single vehicle hazards, you must also learn to detect multiple vehicle hazards. Such hazards are typically formed at "traffic conflict points" (as discussed previously) where traffic converges or intersects, and on highways characterized by high traffic volumes. Due to the high volume of traffic usually found in such situations, hazards are frequently compounded because visibility can be restricted by the other vehicles present. Be aware and adjust your speed and position accordingly.

Other Road User Hazards

Driving a school bus is often made more hazardous by the presence of other road users (besides motor vehicles), including pedestrians, cyclists, joggers and animals. In most cases, these other road users won't be out in the main flow of traffic, but their proximity to the road line seldom guarantees this. Clues to these hazardous situations include:

- Position of the road user relative to the roadway
  - pedestrians or joggers on the shoulder;
  - cyclists travelling on road edge or shoulder.

- Motion of the road user
  - pedestrians running toward roadway;
  - children at play;
  - cyclist approaching from side road.

- Road user's ability to see
  - pedestrian's vision obscured by umbrella, etc.;
  - driver stepping out from parked vehicle while your bus is in "blind spot."

- Attentiveness of road user
  - child chasing a ball;
  - pedestrians engaged in heated conversation.

- Road user's lack of control
  - a motorcyclist turning on a slippery surface, loose gravel.

It is important to realize that the various types of hazards discussed above have been categorized for purposes of presentation only. In an actual driving situation, they frequently arise in combination, requiring split-second thinking and action on your part.

Now turn to p.XXIV in the yellow segment of the Student Question and Answer Section.

COMMENTARY DRIVING

One of the best methods of hazard detection you can practise is the widely used method known as "commentary driving." Basically, commentary driving is a technique whereby the driver speaks out his main observations and interpretations of the events that are developing around his vehicle. The instructor is then better able to measure the mental processing abilities required in driving.

Depending on how the instructor wishes to proceed, commentary driving can, but does not have to, include comments about what actions the driver is planning to take in response to what he sees. In both methods, however, the driver must say what clues he sees (or "tell it like it is").

Some examples of commentary driving include:

- "Open intersection; reduced visibility; speed 40 km/h; following car is tailgating..."

- "Signal light is stale green; oncoming car signalling left; walk light flashed off; pedestrian starting to cross..."

- "Crowned road; narrow shoulder; upgrade ahead; passing car accelerating; no passing signal; following car drifting toward centre line..."

- "Parked cars OK; car approaching from left is stopping; cyclist on the right is looking away..."

Commentary driving is extremely useful when carried out properly because:

1. it creates an awareness of the vast number of things a driver should be watching for and thinking about;

2. it assists the development of good seeing habits and helps the driver resist common distractions;

3. it helps the instructor evaluate student progress and instructor effectiveness.

The Course Manager/Instructor will arrange for a convenient time to conduct an on-bus demonstration and practise of commentary driving. Note carefully the way in which the instructor talks about what he is seeing. When it comes your turn, don't worry or be embarrassed about the way in which you are speaking. After a few minutes, you'll find yourself extremely comfortable with commentary driving.

Just a final note: commentary driving is an excellent means of refreshing and enhancing your skills of hazard detection. Make a point of doing it regularly, even after you've completed this course. At this point turn to p. XXVIII in the yellow segment of the Student Question and Answer Section called Overall Skill Check.

4.3

COLLISION AVOIDANCE

4.3 COLLISION AVOIDANCE

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OBJECTIVE

Be able to correctly answer a series of questions which require you to demonstrate your understanding of the nature of vehicle collisions and the defenses which can be used to avoid them.

Sample Skill Check: Familiarize yourself with the contents of the module before going on by reviewing the Sample Skill on p.XXXIV of the yellow segment of the Student Question and Answer Section.

INTRODUCTION

In the last module, we covered the general topic of detecting driving hazards and introduced a few key methods of detecting and avoiding common hazards. We now want to get more specific and deal with COLLISION AVOIDANCE. The bulk of this module deals with avoiding the two-vehicle collision - perhaps the most serious of traffic mishaps. However, single vehicle collisions and other tyes of collisions are also dealt with.

Perhaps the most useful way to analyze and understand the two vehicle crash is to consider such crashes according to the positioning of the vehicles before the crash occurred. There are only six positions that another vehicle can take in relation to your school bus before a crash. By studying these six positions, learning the hazards associated with each and the defenses against them, you can easily learn to avoid being in most two vehicle crashes.

The following diagram illustrates each of the six positions that the other vehicle can assume relative to your own. They include:

#1 - vehicle ahead

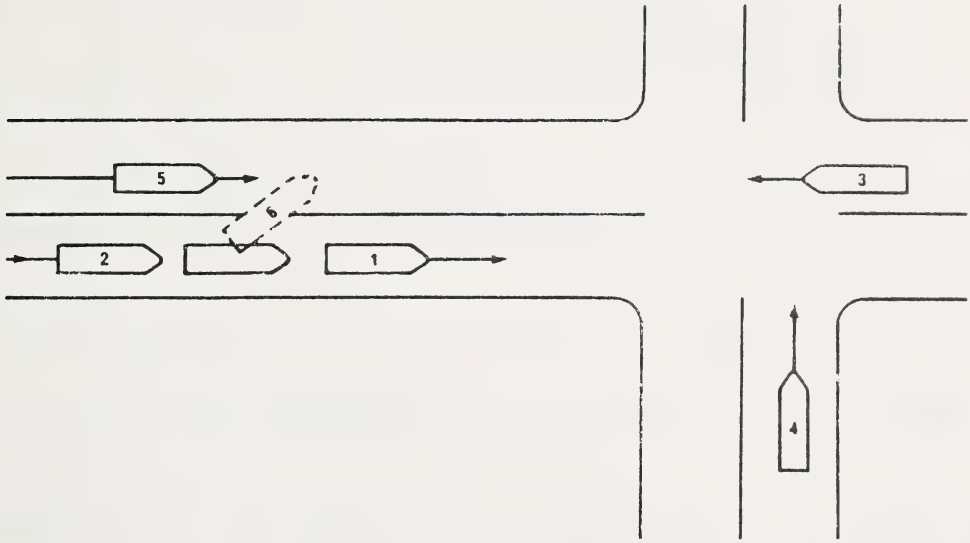
#2 - vehicle behind

#3 - oncoming vehicle

#4 - intersection or angle

#5 - another vehicle passing you

#6 - you passing another vehicle



We will be examining each of these types of collisions in the following sections, as well as the "mystery crash" - the "non-collision," run-off-the-road type of crash.

COLLISIONS WITH THE VEHICLE AHEAD

Rear end collisions are just about the most common type of traffic crash. Roughly 55% of all daytime collisions involving commercial vehicles are rear end collisions.

Why do collisions with the vehicle ahead occur?

Well, there may be a variety of hidden reasons, such as driver inattentiveness, being distracted, etc., but they all boil down to DRIVING TOO CLOSE to the vehicle ahead. When he is required to stop, for whatever reason, you must be able to as well. And, being the driver of a large school bus, there is a very good chance that it will take you longer to bring your vehicle to a full stop than it will the motorist in front of you.

There are two basic defenses against this type of collision: (1) stay alert, and (2) allow a safe following distance. You've heard this before, right? Then how come there are still so many rear enders? And many of them are not just fender-benders, but involve serious injuries.

If you are like most drivers on the highway, familiarity breeds a certain amount of complacency. Being alert and allowing safe following distance requires conscious thinking. You have to frequently be asking yourself, "Could I stop in time if I had to?"

To make sure you are fully aware of what is involved in stopping a school bus (i.e., distance requirements) to avoid a collision with a vehicle ahead, let's review a few facts about braking and stopping.

There are many variables to consider in measuring how quickly a bus can be stopped. Because many of the variables (such as how quickly an individual driver perceives a hazard requiring him to stop) are difficult or impossible to measure, it is only possible to develop average stopping distances. The following table illustrates the average required stopping distances at various speeds for a school bus on hard, dry surfaces.

SPEED TRAVELLED	DRIVER REACTION DISTANCE	VEHICLE STOPPING DISTANCE	TOTAL STOPPING DISTANCE
16 km/h (10 mph)	3.35 m (11 ft.)	3.05 m (10 ft.)	6.40 m (21 ft.)
32 km/h (20 mph)	6.71 m (22 ft.)	12.19 m (40 ft.)	18.90 m (62 ft.)
48 km/h (30 mph)	10.06 m (33 ft.)	28.04 m (92 ft.)	38.10 m (125 ft.)
64 km/h (40 mph)	13.41 m (44 ft.)	50.29 m (165 ft.)	63.70 m (209 ft.)
80 km/h (50 mph)	16.76 m (55 ft.)	77.72 m (255 ft.)	94.48 m (310 ft.)
96 km/h (60 mph)	20.12 m (66 ft.)	112.78 m (370 ft.)	132.90 m (436 ft.)

The average total stopping distance for each speed is shown in the right column. You will notice that it consists of two parts: driver reaction distance and vehicle braking distance. Driver reaction distance is the distance travelled from the time the driver perceives the need to stop and when his foot touches the brake pedal. For most drivers, this takes about 3/4 of a second. Looking at the driver reaction distances, you can see that they increase about 3.5 metres for every 17 km/h the bus is travelling.

Vehicle braking distance is the distance it actually takes to stop the bus once pressure is applied to the brakes. It is this component of total stopping distance that increases dramatically as your speed increases.

This table, hopefully, gives you some appreciation for the need to always be prepared to stop at any time and to drive at speeds which make it possible to stop safely all the time. The distances involved in braking and stopping become staggering at high speeds. And those distances shown in the table are for stopping under good road conditions. There are many other road and weather conditions that can cause your stopping distance to double or even triple, including:

- ice or snow;
- temperature;
- water on the road;
- loose gravel;
- dirt or sand sprayed on the road;
- oil or grease spills (particularly in wet weather);
- slope or grade of the hill;
- type of pavement on road surface.

These conditions all have an effect on the contact that exists between your tires and the road surface. And that contact is one of two major determinants of braking distances; the other is the contact between the brake shoes and brake drums.

So, regardless of how good your brakes are or what type of surface you're driving on, stay well back from the vehicle in front of you and begin braking early when you know you'll have to stop. Delayed braking is an extremely dangerous habit!

Keep in mind the "4 second rule" discussed in Module 1.1:

- Watch the vehicle ahead of you pass some landmark or definite point on the highway.

- Then count to yourself:
  - one thousand and one
  - one thousand and two
  - one thousand and three
  - one thousand and four

- If you pass the same landmark or spot before you finish counting, you are following too closely!

Under poor or slippery conditions, don't hesitate to use the "5 second rule" or even the "6 second rule." The extra precaution can save a lot of grief.

THE VEHICLE BEHIND

You've probably heard it said that it is always the fault of the following driver when a rear end collision occurs. That may be, but in this series we're not concerned with assessing blame; we want you to be able to avoid collisions, regardless of the cause.

One thing you must remember: YOU HAVE A RESPONSIBILITY TO THE DRIVER BEHIND YOU. As you drive down the highway, YOU know what you're going to do; he doesn't. If he's following too closely and you slow down for a turn, without a warning, ...CRUNCH!!

There are three important things you can do to protect yourself and your passengers from this type of collision:

1. Stop smoothly. A gradual stop gives the following driver time to react and space to stop.

2. Signal. Signal your intentions well before you slow or stop. Flash your brake lights, use hand or turn signals.

3. Keep clear. Some drivers are bumper-chasers. When someone rides your tail, slow down and make it easy for him to pass. Even if this doesn't work, you've given both yourself and the driver behind you an extra margin for a safe stop.

AVOIDING THE HEAD-ON COLLISION

One of the first rules of the road that we learn in this country is that you are expected to drive on the right half of the road. There are times, such as when passing, when it is permissible to venture to the left side, but these are specific instances only. If everyone carefully abided by this rule, there wouldn't be head-on collisions.

Circumstances do arise, however, in which you or an oncoming driver cross the centre line and find yourselves on the path of disaster. Some of these circumstances are driver-caused, but some are not. Let's briefly consider some of the reasons why another driver would be in the wrong lane. Being consciously aware of the reasons makes it much more likely that you will be able to anticipate the potential collision and successfully avoid it. The reasons include:

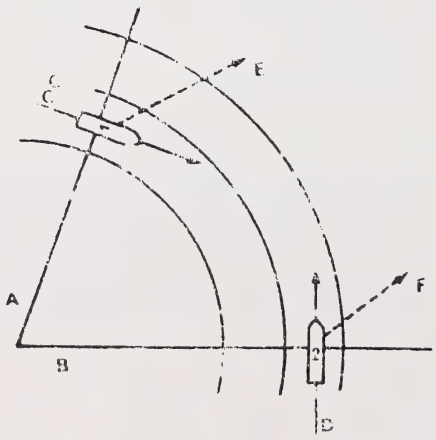
1. A problem in his lane. A driver may come upon some obstruction in his lane (e.g., a construction barrier, pedestrian, animal, cyclist, pothole, etc) and automatically swing left to avoid it.

2. Faulty driving manoeuvres. Through some error of judgement a driver may manoeuvre his vehicle poorly, cutting into your lane of traffic. For example:

- making a wide right turn (frequently necessary in large vehicles with a long wheel base);
- making a left turn at an intersection;
- misjudging the distance required to pass a vehicle.

Since your school bus has a extended wheel base, the point about turning right deserves extra attention: as a general manoeuvring rule, take any additional space needed out of the street being entered.

3. Centrifugal force on curves. Centrifugal force is that force which acts on your vehicle to keep it going in a straight line when you are negotiating a curve. The outward arrows in the following diagram illustrate the centrifugal force acting on the two vehicles.



If driver #1 allows centrifugal force to push him across the centre line, and the oncoming driver overcompensates, a sideswipe or a head-on collision could result.

What is the best way to take a curve? Slow down before you enter the curve. On right curves, keep the front of the bus close to the left of the line and closely watch the right hand mirror for the position of the rear of the bus. On left curves, keep the front of the bus to the right of the lane, watching the left mirror. Apply power to the wheels when in the curve (not before you go into the curve!).

Why apply power to the wheels when taking a curve? It cuts down the effect of centrifugal force. It works like this: when you apply power to wheels, you introduce a force in a different direction than the pull of centrifugal force. The result is greater control.

4. Loss of control. Drivers can lose control of their vehicles for a variety of reasons, including:

- right wheel dropping off pavement and the driver overcompensates in making a recovery:
- loss of visibility; centre line obscured or worn away;
- falling asleep at wheel; alcohol or drug intoxication;
- tire blowout; skidding on slippery surface.

When these circumstances arise, what can you do to avoid hitting head-on?

The following 4 point prescription has been developed for just such circumstances. Learn it, remember it, and practise it to avoid the "head-on":

Rule Number 1 is "Read the Road Ahead."

Be aware of oncoming traffic. Try to anticipate what problems the oncoming driver is going to have that might cause him to become your problem.

Rule Number 2 is "Ride to the Right."

Don't crowd that centre line. Give it plenty of room. Remember those torn centre barriers we were talking about.

If there are two lanes of traffic moving in each direction, use your right lane as a matter of preference and habit. This keeps you away from the centre line. Also, traffic in the right lane usually moves with fewer interruptions than traffic in the left lane because vehicles turning right cause less delay than vehicles turning left.

This doesn't mean that you can't use the lane nearest the centre line. When you do, however, give that centre line plenty of room while staying in the centre of your lane.

Rule Number 3 is "Reduce Speed."

When you see a threat developing, an oncoming vehicle that may move into your lane for some reason, reduce your speed. This means to slow down right away. Also, sound your horn or flash your lights to warn the erring driver if you think he has not seen you.

By slowing down, you may give him time to get back into the proper lane and avoid a head-on collision. Continue slowing down and preparing to stop until the situation clears.

Rule Number 4 is "Ride Right off the Road."

If you have followed the first three steps by reading the road ahead, keeping to the right and reducing speed, and he still keeps drifting across the road into your path, you have only one out left - to ride off the road where practical. This action probably will be better than a head-on collision. Never try to outguess the other driver by pulling to the left.

You have just completed the first part of Module 4.3. Before going on, do the Review Check on p. XXXVI.

THE INTERSECTION COLLISION

About one-half of all two vehicle collisions occur at intersections. This is largely due to the traffic conflict which exists at intersections, both vehicular and pedestrian. This constant conflict makes being prepared for the unexpected the order of the day.

Here are a few hazard clues peculiar to intersections which you should guard against:

- The stale green light. The green light that has been visible for a block or so and may change at any second.

- The vehicle in the left lane, waiting behind the turning vehicle. He may get impatient and, without warning or signal, swing over in the right lane to get around.

- The vehicle sitting at an intersection when the light is green. Be suspicious - he may be waiting for oncoming traffic to clear. An oncoming vehicle turning left could cross into your lane or another vehicle could be passing through the intersection.

- The driver making a turn. He may have signalled, moved out, and then, for some reason, he suddenly stops, putting you on the spot.

The proper way to negotiate intersections can be described by 4 words which carry a lot of meaning: KNOW, SLOW, SHOW AND GO.

KNOW - drivers do unexpected things at intersections, so expect the unexpected;

- in advance what you want to do at the intersection. Your indecision can confuse other drivers and cause a collision;
- the rules regarding yielding;
- that at intersections, you can only proceed when your judgement tells you it is safe to do so. Be prepared to YIELD at all times.

SLOW - slow down gradually - an intersection is not a place for speed. Remember, at 25 km/h you cover 7 metres per second and may use up 5 metres of valuable space in just moving your foot from the accelerator to the brake.

SHOW - signal your turn well in advance to let other drivers know your intentions and get in the proper lane.

GO - get through the intersection without hesitation or over-caution, so as not to confuse other motorists.

It's important to keep in mind that the hazards surrounding intersections are also present in other locations, such as driveways and private roads which enter onto highways. And many two-vehicle collisions at intersections result from the distraction of other hazards: pedestrians, cyclists and animals. Beware!

To conclude this section, here are 3 simple rules which should guide your behaviour at all intersections:

1. Never assume that the other driver will yield. Approach each intersection with your foot off the gas and poised over the brake pedal.

2. As you approach an intersection, look first to the left to make sure other traffic is yielding, then to the right. When you are near the intersection, check again for unusual or unsuspected action to either side.

3. Proceed ONLY when you can see that it's safe, regardless of stop signs or the law. You can't count on the other driver always obeying the rules.

BEING PASSED BY ANOTHER VEHICLE

As the driver of a large school bus, you are aware that most motorists would rather drive in front of you than behind you. Many drivers resent "being trapped" behind a school bus that is frequently stopping to load and unload students. Consequently, you are probably being passed far more frequently than you pass others.

However, as traffic builds up behind your bus, the likelihood increases that drivers behind will become impatient and take risks, such as:

- tailgating - staying too close behind your bus and then darting out to see if a pass can be made;

- following the leader - a series of cars passing you at the same time, even though the second and subsequent cars have extremely limited visibility.

When drivers take such risks, it creates the potential for involving you in three types of collisions: (i) the sideswipe, (ii) the cut-off, and (iii) being run off the road.

As a defensive driver, what can you do to help the motorist out who is or may be attempting to pass you?

1. Make it easy. As you are being passed, check oncoming traffic. Then, slow down if the passing vehicle will need more room to get back in line in front of you.

2. Check the rear. Before you change lanes, check your rear view mirrors and glance back to make sure your blind spot is clear. Use your turn signals, then move over only when the lane is clear.

3. Pull off. If traffic is building up excessively behind the bus, pull off the roadway when it is safe to do so and proceed after traffic clears.

4. Keep right. Get into the proper lane for a turn EARLY. When turning right, stay close to the right curb to block anyone from passing on the right. Use your turn signals early.

5. Check, then move. Don't nose out of a parking space to look for oncoming traffic. Take a good look before you move. Signal, wait for a break in traffic, then pull out promptly.

6. Let the other driver decide. Under no circumstances should you use your directional signals, lights, or wave your arm to the driver behind that it is safe for him to pass.

THE ART OF PASSING

Passing another vehicle is the last of the "six positions" in which you can be involved in a two-vehicle collision. Given the size and weight of a school bus, passing can be both a difficult and risky manoeuvre.

Why do you pass another vehicle in the first place? Well, usually you figure the other driver is moving too slowly and is holding you up. But do you really gain much by passing him? In reality, very little! How often do you notice a car you've passed pull up beside you at the next stop light? And passing tends to put needless wear and tear on your bus and increases fuel consumption significantly.

Admittedly, there is nothing wrong with passing another vehicle so long as it is done where it is safe and legally permissible to do so. But, we want you to realize at the outset: YOU GAIN LITTLE, IF ANYTHING, BY PASSING.

Since, at some time, passing will be necessary, let's consider the proper way to do it. The Canada Safety Council advocates a method known as the thirteen points to perfect passing, which outlines clearly how a good pass is made. That may seem like a lot to remember, but they're easy once you think them through. Here they are:

1. Is this pass necessary?

   You may not need to pass at all and, rather than take a chance and break the tempo of traffic, it might be better to continue along as you are. Before attempting any pass, the defensive driver will always ask himself: is this pass necessary? If the answer is NO, then he doesn't pass.

2. Stay back and maintain safe following distance

Too many drivers forget what they have learned about following distance when they start the passing manoeuvre. They creep up behind the vehicle ahead so they can dart out into the left lane as soon as an opening occurs. This is hazardous because the vehicle ahead may stop suddenly. Also, the closer you get to the vehicle ahead, the less you can see.

3. Check ahead

You need to know if oncoming traffic is using the left lane, since that is their lane. Check also for anything else that might interfere with your passing manoeuvre. If there is another car coming from the opposite direction, you've got to decide whether you have the time and passing distance you need to get into the left lane, pass the vehicle ahead, and get back into the right lane before this vehicle reaches you.

4. Check traffic behind

Don't move left until you know what's behind you in the event that someone is overtaking your vehicle. Use the mirrors and shoulder check sequence to check both sides and the blind spot.

5. Accelerate

Build up to an adequate speed to ensure a safe pass in the space available. You can still change your mind at this point, if necessary.

6. Signal left

Use your signal lights to warn traffic behind you what you intend to do. A good driver in the vehicle ahead will also be aware of your signal. Check over your left shoulder.

7. Move left

Now you are really committed; you are in the passing lane and it is your responsibility to make a safe pass. Ensure you have centred your bus in the lane and that you have provided clearance for the vehicle being passed.

8. Gently tap your horn

Tap your horn just before you reach the other driver's blind spot. Use common sense here. It isn't always necessary and may create confusion in heavy city traffic. However, if you see that the vehicle you are overtaking is drifting or weaving in its lane, use your horn.

9. Check behind

When you have partially passed the other vehicle, you could have speeded up a bit, thereby complicating your return to your normal lane. At a certain point, he may disappear into your offside blind spot.

10. Signal right

Signal your intention and check over your right shoulder and right outside mirror.

11. Move right

Now move smoothly back into your normal driving lane, checking your mirrors to be sure it is safe and to be certain that you have sufficient space behind you to do so.

12. Cancel your signal

13. Adjust speed

Now that you have regained your position in the lane, adjust your normal cruising speed. The main point here is not to move back into the driving lane and immediately drop back on your speed.

There you have it - the thirteen points of a perfect pass. Each one is important and you should cover them mentally every time you prepare to pass another vehicle. Do Review Exercise on p. XXXIX in the Student Question and Answer Section.

THE MYSTERY CRASH

The "mystery crash," so named because it is difficult for police authorities to determine its cause, is that type of crash in which the driver, for some reason, loses control and runs off the road into an embankment, tree, abutment or other fixed object. This type of collision has a very high mortality rate.

The key to this type of collision is the driver's loss of control. By control, we usually mean the driver's ability to steer and to stop his vehicle. Although stemming from a variety of causes and contributing factors, loss of control frequently follows "driving too fast for prevailing conditions."

Driving too fast for prevailing conditions sounds like a nice catch-all, but what it really means is too fast, with respect to one or more of the six conditions discussed in Module 4.1:

1. light conditions

   - overdriving your headlights at night. The average headlights are only capable of illuminating the highway for approximately 100 metres. Consequently, if your drive more than 80 km/h at night, it's unlikely you will be able to stop in time should you have to;

   - suffering from headlight glare at night. The human eye takes about 7 seconds to recover from headlight glare. At 80 km/h, you would travel 160 metres in those 7 seconds;

- suffering from sunglare in the morning or late afternoon or from glare on a bright winter day. Be sure to keep your windshield clean and wear sunglasses to protect your eyes.

2. weather conditions

- driving rain, snow, sleet and fog all contribute to loss of vehicle control. They are doubly dangerous, however, because they reduce other driver's ability to see you clearly. Reduce your speed, drive with your headlights on and, if conditions get bad enough, don't drive at all.

3. road conditions

- curves, crowns, dips and inclines all limit the speed at which you can drive your bus.

4. traffic conditions

- some drivers think that the good driver is one who can weasel his way out of tight spots by quick manoeuvres. Many run-off-the-road collisions probably reflect the deliberate choices of some "escape artists" who took a chance once too often. The defensive driver looks far ahead, anticipates traffic situations, uses good judgement, and avoids getting into tight spots in the first place.

5. vehicle conditions

- bad tires finally blowing out at high speeds;
- bald tires unable to grip the road on a bad curve;
- defective brakes, etc.

6. driver conditions

- driving requires both mental and physical sharpness. Physically, you are highly dependent upon your vision directly ahead, as well as your peripheral vision, which acts as a warning device for events happening around you;

- driving demands that you keep your eyes moving - scanning the road ahead, and to the left and the right of the roadway. Every few seconds, check your rear view mirrors to be aware of any vehicles that may be following or trying to pass;

- sometimes, your attention is focused not on the outer world but on your inner world: the world of your mind. Your eyes are wide open and you are looking at the road ahead, probably with a more or less fixed stare, but your attention is really turned inward, where you are grappling with a particular problem or merely day-dreaming. Again, keep scanning the environment to keep your focus shifting. And, make sure you are well rested before beginning your run;

- driving while under the influence of medication. Drugs serve a useful purpose when they are prescribed by a physician. But, when your doctor prescribes any of these, you should discuss with him what effect, if any, they can have on your driving ability and whether you should drive at all when under such medication;

- over 30% of drivers involved in fatal crashes have been drinking. That is why many school jurisdictions in Canada forbid driving of a school bus within 8 hours of consuming alcoholic beverages.

Summarizing briefly, keep in mind these points about the "mystery crash":

1. It can happen to anyone - even you.

2. It is a very severe type of crash. Fatalities are frequent and injuries are usually very serious.

3. It is the most preventable type of crash because it involves maintaining control of yourself and your vehicle.

4. The major cause of this type of collision is driving too fast for conditions. So, keep your speed down, start slowing down sooner, and always adjust your speed to conditions of light, weather, road, traffic, vehicle, and driver.

5. Be sure of your own physical and mental fitness to drive. You can't control your vehicle if you are not in control of yourself.

OTHER TYPES OF COLLISION

Throughout this module, we have focused on avoiding the two vehicle collision and the single vehicle mystery crash. These are not the only types of collisions you could be involved in, but they were stressed because of their seriousness and frequency of occurrence. No less important are the collisions which you may incur with pedestrians, fixed objects, bicyclists, animals, etc.

There are no magic formulas for avoiding these types of collisions, but the points of defensive driving covered in previous sections are equally applicable. Be alert and aware of the hazards, and be sure of your own mental and physical fitness to drive. Always keep in mind the defensive driving formula:

1. KNOW THE HAZARD
2. UNDERSTAND THE DEFENSE
3. ACT IN TIME

PRACTISE ON YOUR OWN

It is strongly recommended that you go out and practise the techniques discussed in this module on your bus. We're not suggesting that you deliberately get yourself into some near-collision situations, but, you can practise collision avoidance in your everyday driving.

Ask one of the other course participants to go with you. You can each take turns using "commentary driving" techniques to practise collision avoidance. And, you'll probably find it useful to compare notes when you've finished.

To finish off this module, do the Overall Skill Check when you feel ready. It is on p. XLIV of the yellow segment of the Student Question and Answer Section.

4.4

EMERGENCY DRIVING TECHNIQUES

4.4 EMERGENCY DRIVING TECHNIQUES

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OVERALL SKILL CHECK LIX

OBJECTIVE

Be able to correctly answer a series of questions concerning the techniques you would employ to deal with the following types of emergency driving situations:

- skidding
- tire blowout
- loss of brakes
- loss of visibility
- obstructions in the roadway

Sample Skill Check: Review this before going on. It is on p. XLVIII in the yellow segment of the Student Question and Answer Segment.

INTRODUCTION

Professional drivers don't rely on their skill to get them out of tight spots - they depend on their judgement to avoid them. It's a lot easier to stay out of tight spots than to get out of them. Consequently, in Modules 4.1 to 4.3, we focused on prevention and avoidance of traffic collisions.

Most of us learn to drive under favourable driving conditions and, if we practise defensive driving, can, hopefully, avoid those tight spots. However, the odds are that, at some time, we will all be confronted by an emergency situation which demands split-second clear thinking and evasive action. It's not practical for you to go out and deliberately put yourself in emergency situations so you can practise getting out of them. But you can, and should learn the proper techniques for dealing with emergency driving situations to prepare yourself for them when they do occur. When they occur, it's too late to learn!

In this module, you will learn how best to deal with each of the following emergency driving situations;

- skidding
- tire blowout
- brake loss
- obstruction in the path of your bus
- sudden loss of visibility

The procedures in this module are" last ditch" measures to avoid a crash, if at all possible. Since it is impossible to completely eliminate human error in the performance of routine driving tasks, your ability to take appropriate and immediate action under emergency conditions becomes critical.

SKID CONTROL

Any number of factors can cause a school bus to go into a skid. During a skid, the tires lose proper traction on the road surface. The normal means of controlling the bus are affected - steering, braking, decelerating and accelerating. You must be able to detect a loss of traction in time to maintain or regain control of the bus. Loss of traction may include:

- skids caused by tire failure, resulting from underinflation or sudden deflation from a blowout;

- front wheel skids resulting from faulty brakes;

- rear wheel skids resulting from faulty brakes, excessive acceleration or speed on curves, rough or slippery surfaces;

- four wheel locked brake skid resulting from inappropriate application of brake pressure;

- hydroplaning, resulting from travelling too fast on a water-covered roadway, with lack of attention given to tire, tread and pressure;

- skids caused by oil on the road after the first few minutes of rain.

Once you lose traction and your bus goes into a skid, the correct way to regain control is:

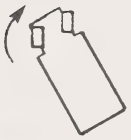
1. Steering

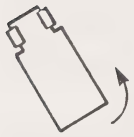
Turn your wheels in the same direction the rear of the bus is skidding. Be careful - don't oversteer! You'll be able to feel "when" the bus regains traction. Then, straighten the wheels.

Watch out, though! Frequently, a skid in one direction is followed by one in the opposite direction (often caused by oversteering while in the first skid). As the bus fishtails in the opposite direction, steer in the direction of the new skid.

The correct steering procedure is illustrated in the following diagram (read bottom to top).

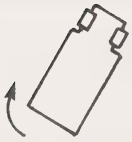
(7) Steering control is re-established.

(6)  To control fishtailing in the opposite direction, you'd countersteer right to help you get back on course.

(5)  The back end fishtails to the right.

(4) The bus is back on course.

(3) You'd steer left, in the direction you want the bus to go relative to the way it's facing.

(2)  The back end of bus skids around to left (the bus is still moving forward on an angle).

(1) The bus is going straight.

2. Braking

Never hit the brakes during a side skid. After you feel the bus regaining traction, the best way to slow or stop the bus without causing a further skid is to pump the brakes with hard, rapid jabbing and releasing of the brakes.

A couple of other points about regaining control in a skid:

- Deceleration: remove pressure from the accelerator smoothly - not suddenly.

- Acceleration: do not accelerate until steering control is re-established. Once re-established, shift to a lower gear and accelerate gradually to maintain traction.

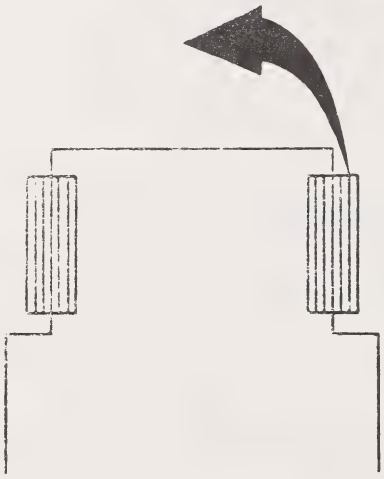
As with any emergency situation, the important thing is to avoid panicking or over-reacting. Respond consciously and deliberately at all times.

TIRE BLOWOUT

Equally as frightening as going into an uncontrolled skid is a tire blowout.

If one of your front tires blows, there will be a strong pull in your steering toward the side with the blowout. A back tire blowout on your bus may or may not cause the back end of the bus to swerve. The double wheels on the rear of the bus provide a good stabilizing influence - unless two tires on the same side were to blow at once.

Left front tire blows out. The rubber acts like a brake on this side.



The right front tire has no braking action on it. So, the bus is likely to "pull" hard to the left. You'll have to grip the wheel hard to maintain steering in a straight line.

When it happens:

1. Grip the steering wheel firmly and steer your vehicle straight down the centre of your lane.
2. Do not apply your brakes immediately.

3. Take your foot off accelerator. If bus starts to skid, follow skid procedures outlined previously.

4. If a quick stop is required to avoid some other hazard, brake moderately, pumping the brake pedal.

5. Activate right turn signal, move right slowly, out of the lane of traffic, and stop. Watch out for soft shoulders which could make the control of the bus even more difficult.

6. Activate 4-way hazard lamps, not alternately flashing lights.

7. Decide whether the children should be evacuated while the repair is being made.

8. Follow procedures for Mechanical Breakdown, describe in Module 5.4.

Before going on to next section, check what you've learned by doing the Practice Exercise, p. L in yellow segment of the Student Question and Answer Section.

LOSS OF BRAKES

You are driving along the highway, you step on the brake pedal to slow down or stop - and the pedal slaps uselessly on the floor. It's a terrifying experience that will bring your heart up into your throat! What would you do?

1. Pump the brake pedal! If there is any resistance at all, you may be able to work up enough pressure to help some.

2. Sound your horn and flash your lights to warn other drivers that you are out of control.

3. Downshift to the lowest gear possible. If the way ahead is clear, allow the engine compression to slow you down and stay on the road. Try to slow the bus down more by gradually applying the emergency brake so as not to lock the rear wheels. As you slow down enough, select a path for leaving the roadway and bring the bus to a stop on the shoulder.

4. If there is no upgrade within clear distance ahead in which to stop the bus, you must leave the road to avoid a crash, select the path that will be most likely to minimize (i) injury and (ii) property damage (in that order). Look for something to sideswipe - roadside brush, a snowbank, a guard rail, even parked cars - that will slow you down. If you must go into a bank, do so at an angle to lessen the chances that the bus will flip over.

LOSS OF VISIBILITY

Several things can happen to cause a sudden loss of visibility - your headlights fail, your hood flies up, mud and slush gets splashed on the windshield, etc. They are all similar in that you suddenly can't see where you're going and you must attempt to stop as quickly as possible before you lose steering control or hit something. But, each is a little different as well. So, let's consider what you should do in each situation separately.

If The Hood Flies Up

1. Lower you head and try to look through the gap at the hinge.

2. Look out the left and right windows to help keep your sense of direction.

3. Apply brakes moderately.

4. Activate your right turn signal.

5. Steer out of the traffic lane and stop.

6. Activate four-way hazards lights (not alternately flashing lights).

If Your Headlights Fail

1. Immediately hit the dimmer switch and make sure passenger dome lights are off.

2. Activate right turn signal and four-way hazard flashers.

3. Use available environmental light to keep sight of road.

4. Brake as hard as you can without throwing yourself into a skid. The idea is to pull your speed down quickly before a slight steering error takes you off the road.

5. Steer out of the traffic lane and stop at the side of the road.

If Mud/Slush is Splashed on Windshield

1. Apply brakes cautiously, look out side windows to keep sight of road.

2. Turn on wipers.

If Windshield Wipers Fail During Rain/Sleet/Snow

1. Look out the side windows to keep sight of road.

2. Apply brakes cautiously.

3. Activate right turn signal.

4. Pull over as far to the right as possible, or off road, and stop.

5. Engage four-way hazard flashers.

EVADING AN OBSTRUCTION

When you suddenly see an obstruction - a pedestrian, ball, another vehicle, construction barrier, etc. - in the direction path of the bus, you must take evasive action to avoid hitting it. Evasive action is simply the exercise of your fundamental driving manoeuvres under conditions of stress - limited time, space and distance. You must decide which of these evasive actions you should perform to avoid hitting the obstruction:

- controlled braking;
- quick steering to the right, with or without braking;
- leaving the paved portion of the roadway, with or without roadside hazards present.

For effective evasive action, you must be able to inhibit the tendency to slam on the brakes. Generally, drivers tend to apply the brakes at the first sign of trouble. While effective in many instances, braking can lock the wheels an cause loss of steering control, making it impossible to steer away from a collision.

You may decide that braking to a stop is the best evasive action you can take to avoid the obstruction. This will depend on how fast you're going, how far away the object is, how good your tires are, and whether the road is wet or dry.

Because the obstruction is an emergency, you won't have time to do lengthy calculations. If it's not instantly obvious that you can stop in time, you must choose to steer the bus in an alternate path. You must be able to recognize quickly the best "escape route." At a glance, decide:

- whether a possible escape path is free of hazardous obstacles;

- whether clearances are sufficient to allow the bus to pass through them;

- whether an off-roadway surface will permit steering control;

- whether the obstruction is likely to move into your escape path;

- whether one escape route is safer than another.

The size and weight of the bus limits its ability to swerve sharply to avoid an object or to leave the pavement with any great degree of control. Overturning is a danger. STEER FIRMLY AND AS GRADUALLY AS POSSIBLE TO STILL CLEAR THE OBSTRUCTION. USE ONLY CONTROLLED BRAKING.

It can't be stressed enough that your decision will probably have to be a split-second one. Rehearse these points so that you can decide what evasive action is best:

- If you're travelling as fast as 65 km/h, the obstruction has to be at least 60 metres away from you to stop safely. That's 2/3 of a football field! Any closer and you'd better steer around it or off the road.

- Behind every rolling ball, there's likely to be a running child. Just because the ball clears your path in time doesn't mean you're out of danger.

- If you're in a tight spot, hitting the obstacle might be the safest thing to do. For example, with heavy oncoming traffic and heavy pedestrian traffic on sidewalk to your right, suppose a construction warning sign is the unexpected obstacle, less **than 15 metres away in your lane. You're going 40 km/h.** You can't stop in time, and steering left or right would create a **worse collision.** You may assess the relative dangers and decide it's better to demolish the sign.

IN ANY CASE, WHERE COLLISION IS ABSOLUTELY UNAVOIDABLE, TRY TO:

- avoid a head-on collision; collision at an angle reduces force of impact;

- avoid hitting human beings. If you have a choice, it's better to hit inanimate objects than people or animals.

Remember: you're more likely to avoid hitting any obstruction in the path of the bus if you always anticipate the unusual and practise effective evasive action so it becomes as automatic as possible.

This concludes the section and the module. Test your knowledge of the section on Further Review, p. LIV. When you have done this satisfactorily, try the Overall Skill Check on p. LIX.

APPENDIX A

RAILWAY CROSSING SAFETY

It should be noted that this appendix is designed to furnish the driver with further information regarding railway crossings.

The following is an outline of statistics and facts[1] which may be of interest.

COLLISION STATISTICS:

a) Each year in Canada, approximately 100 people are killed and an estimated 500 are injured (requiring medical attention or hospitalization) in rail/highway crossing incidents.

b) The number of rail/highway crossing incidents averages about 1,000 annually.

c) About 43% of all rail/highway crossing collisions occur at crossings equipped with flashing lights and bell or flashing lights, bell and gates!

d) Approximately 40% of all rail/highway crossing incidents involve a vehicle striking (running into) a train.

e) Rail/highway crossing collisions are the most severe type of highway collisions. They are at least 15 times more likely to result in death than any other collision.

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[1]Statistics and facts used in this outline are taken from Operation Lifesaver material.

f) The major cause of rail/highway crossing collisions is the failure of motor vehicle operators to stop or exercise due care and caution or to observe and comply with existing laws and regulations.

g) At least 32% of the drivers involved are in the 21-30 years old age group.

RAILWAY FACTS:

a) An approaching train activates flashing light signals and gates several seconds before the train reaches the crossing.

b) An eight-car passenger train (and that is a short one!) travelling at 100 km/h requires 1,070 m to stop. When travelling at 130 km/h, a stopping distance of 1,825 m is required.

c) The average 150-car freight train travelling at 50 km/h needs 960 m to stop. AT 100 km/h, the same freight train needs about 2 1/4 km to stop.

d) An automobile travelling at 90 km/h requires about 70 m to stop.

e) The average locomotive weighs 110 t.

f) The average loaded box car weights 70 t.

g) The average automobile weighs 2 t.

When one considers the aforementioned facts and figures, it becomes quite obvious that something needs to be done to solve the problem on hand.

One way of doing this is to make drivers (and the public in general) aware of the three E's (Education, Engineering, Enforcement) as they apply to rail/highway crossing safety.

The first phase (and most important) is Education. The second phase is Engineering. Here the Railways, Federal, Provincial and Local Authorities work together to make crossings safer. One factor which comes into the picture here is cost: $3,000 yearly is required to maintain a crossing with standard flashing lights! If this seems expensive, the cost for building a rail/highway separation in which the train travels either above or below highway traffic is almost prohibitive: the price for each of these structures runs into several million dollars.

The third phase is Enforcement. Law enforcement agencies can help to reduce the rail/highway crossing incidents by coming down hard on motorists who violate laws regarding rail/highway crossings. But one must point the finger at parents and teachers, as well: they too have an important part in enforcement. They and you must set <u>good</u> examples.

Last, but not least, one must consider some common collision causes as well as the <u>correct</u> driver action. A few examples follow:

1. The driver sees the train approaching the crossing, but misjudges its speed and distance from the crossing.

Because of its size, misjudging a train's speed and distance is easy. Therefore, drivers should stop and wait for the train to pass.

2. A driver races the train to the rail/highway crossing, and is either struck by the train or runs into its side.

A driver must never race a train to the crossing. Drivers who do this are simply gambling with death.

3. When the train clears a rail/highway crossing, the driver immediately proceeds across the tracks without looking for other trains. A train, travelling on an adjacent track, either strikes or is struck by the vehicle.

Drivers must be patient and wait for a train to proceed a sufficient distance beyond the crossing so good visiability in both directions is ensured. A driver should never move while the flashing lights are operating. They stop flashing when it is safe to cross the tracks. However, even after the lights have stopped flashing, it is a good idea to double check in both directions before crossing the tracks.

4. A driver does not exercise caution when approaching a familiar rail/highway crossing because a train is not expected at this crossing at this time.

Familiarity breeds complacency. When approaching a crossing, a driver should always look for trains. Remember "Anytime is Train Time"!

5. When visibility at the rail/highway crossing is limited because of weather conditions or sight obstructions the driver does not exercise proper caution and proceeds into the path of a train.

Drivers should reduce their speed and be especially observant if weather conditions or sight observations limit visibility of the rail/highway crossing and/or approaching trains.

These are just a few examples. More information on common collision causes/ correct driver action as well as rail/highway crossing safety in general can be found in the OPERATION LIFESAVER program guide.

To summarize, too many people are killed and injured each year at rail/highway crossings. The problem is real, it is not the product of somebody's imagination. In order to solve this problem (and thereby protect people's lives), it is important that everyone work together to each the ultimate goal: to reduce railway/highway crossing incidents, their related deaths and other relevant damages.

APPENDIX B

Drive Safe and Smooth and Save

Safe, smooth driving could save your company 15-20% of the annual fuel costs of a school bus. Let's review the safe driving rules that save dollars.

1. Attitude - The right attitude is essential for safe, economic driving. A responsible professional driver is concerned about the safety of his vehicle, his passengers and the financial well-being of the bus owner/school district.

2. Safe, Smooth Driving means courteous, fuel efficient driving. You use energy to accelerate and gain momentum; you waste energy when you brake to slow down or stop. Looking ahead 12 seconds down the road at the traffic situation and maintaining a 4 second following distance between vehicles gives you space to slow down, accelerate or change lanes safely and smoothly. The objective is to try to minimize speed changes by being in harmony with the traffic tempo and, in urban areas, in phase with the traffic lights.

3. Reduce speed - High speed increases potential for collisions and increases fuel consumption. Because of the shape of most school buses, 10-15% of fuel could be saved if vehicles were driven at 70 km/h (45 MPH) instead of 90 km/h (55 MPH) on highways.

4. Tire Pressure - Keep tires inflated to their recommended pressure. This will result in safer and longer tire life. You save on tire replacement cost and fuel bills.

5. Weather/Road Conditions - It takes energy to splash water, push snow or plow through gravel and mud. For safety, economy and passenger comfort, whenever possible drive the cleared, paved routes even if it's a little further. In snow, follow the tracks, and on wet roads, stay in the dry tire prints left by the vehicle or edge of the road. Respond to the wind forces by driving more slowly into the wind and letting it help you along when driving with the wind.

Other Energy Saving Driving Tips

6. Shifting Gears - Get into high gear quickly. An automatic will shift earlier if you reduce pressure on the gas pedal as you gain speed. With manual transmissions, shift at an engine speed just high enough to permit progressive upward shifting (near the rpm for peak torque). Don't rev the engine to peak rpm between each shift.

7. Driving Hills - Going uphill, look ahead and gradually accelerate before the point where the vehicle would normally start to slow down. Don't floor the accelerator to maintain speed; let the speed fall off. Going down hill, ease up on the accelerator and save fuel by letting gravity maintain or increase the vehicle momentum.

8. Avoid Idling - Idling gets you nowhere. Ten seconds of idling uses more fuel than restarting your engine. Except in traffic, turn the engine off when stopped. The best way to warm up a vehicle is to drive away smoothly as soon as you can.

9. Auxiliary Equipment - Turn off energy consuming equipment when not required, i.e. auxiliary rear heaters, electric defrost, fan motors, etc.

10. Pumping Gas Pedal and Revving Engine - Rapid depression of the gas pedal ("Pumping Gas Pedal") pumps a jet of gas into the carburetor. This pumping action may be required for cold weather starts or after a vehicle has been standing idle for days. Unnecessary pumping of the gas pedal/revving the engine wastes fuel and could cause engine damage.

Additional publications on vehicle fuel savings topics are available from:

Alberta Energy & Natural Resources
Energy Conservation Branch
2nd Floor, Highfield Place
10010 - 106 Street
Edmonton, Alberta
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Phone: 427-5200

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